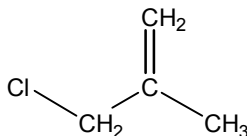


3-CHLORO-2-METHYLPROPENE

CAS No. 563-47-3

First Listed in the *Fifth Annual Report on Carcinogens*



CARCINOGENICITY

3-Chloro-2-methylpropene is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (NTP 300, 1986). When administered by gavage, the compound caused increased incidences of squamous cell papillomas of the forestomach in rats and mice of both sexes. Squamous cell carcinomas of the forestomach were increased in male rats and in mice of both sexes.

There are no data available to evaluate the carcinogenicity of 3-chloro-2-methylpropene in humans.

PROPERTIES

3-Chloro-2-methylpropene, also known as methylallyl chloride and methallyl chloride, is a colorless-to-straw-colored, volatile liquid with a pungent odor. It is insoluble in water but is very soluble in chloroform, and it is soluble in acetone, alcohol, ether, and benzene. The technical grade may contain 5% dimethylvinyl chloride. 3-Chloro-2-methylpropene is relatively stable at room temperature but is flammable at higher temperatures. It reacts vigorously with oxidizing materials and, during decomposition by heating, emits toxic fumes of hydrochloric acid and other chlorinated compounds.

USE

3-Chloro-2-methylpropene is used primarily as a chemical intermediate in the production of carbofuran (90%-95% of the 3-chloro-2-methylpropene produced), a carbamate insecticide used mostly on corn (USEPA, 1984, 1985), as well as the production of plastics, pharmaceuticals, and other chemicals (Sax, 1987; Merck, 1983). It is also used in the production of herbicides (5%), as a textile additive (1.8%), and as a perfume additive (0.6%) (USEPA, 1985). 3-Chloro-2-methylpropene was also employed as a fumigant for grains, tobacco, and soil (HSDB, 1997).

PRODUCTION

The 1997 Directory of Chemical Producers lists one company yielding an undisclosed amount of 3-chloro-2-methylpropene (SRIa, 1997). Although the USITC does not currently list 3-chloro-2-methylpropene (USITC, 1995), it did report that one company produced an undisclosed amount of the compound from 1983 to 1988 (USITC, 1984-1989). In 1982, the only domestic manufacturer of 3-chloro-2-methylpropene produced 10.5 million lb, and the EPA

reported that virtually none of the compound was imported (USEPA, 1984a). The majority of the compound was used to produce carbofuran, and < 1 million lb were sold as a commercial product. In 1978, one manufacturer produced 10 million lb of 3-chloro-2-methylpropene (TSCA, 1986). The TSCA Inventory listed one manufacturer in 1977 with a production of 10 million lb; total 1977 production and imports were estimated to be 12 million to 24 million lb (TSCA, 1979). No export data were available. The EPA OPPT (Office of Pollution Prevention and Toxics) High production Volume chemicals list gives a production volume range of 16.6 to 24.6 million lb.

EXPOSURE

The primary routes of potential human exposure to 3-chloro-2-methylpropene are inhalation, ingestion, and dermal contact. Occupational exposure may occur during manufacture of the chemical or while using 3-chloro-2-methylpropene an intermediate in organic synthesis (NTP 300, 1986). Its former use as a fumigant will also have resulted in its direct release to the environment (HSDB, 1997). Consumers may be exposed by ingesting food products that have absorbed some of the chemical (NTP 300, 1986). As there is only one known U.S. manufacturer, and 90%-95% of the 3-chloro-2-methylpropene produced is used by this firm to produce carbofuran, the majority of occupational exposure to the chemical is site limited. In 1986, the EPA estimated that only 8 –to 12 workers per year potentially were exposed (noncontinuously) to 3-chloro-2-methylpropene. The workers are required to wear gloves, which reduces the likelihood of dermal exposure. The average air concentration in the manufacturing plant is 17 ppb (0.013 mg/kg per day worker exposure); chemical operators' breathing zone samples showed an average concentration of 48 ppb. The EPA also reported that consumer exposure appears to be minimal (USEPA, 1985).

3-Chloro-2-methylpropene was not listed in the National Occupational Exposure Survey conducted by NIOSH from 1981 to 1983. The National Occupational Hazard Survey, conducted by NIOSH from 1972 to 1974, estimated that 1,683 workers were potentially exposed to 3-chloro-2-methylpropene in the workplace (NIOSH, 1976). This estimate was derived only from observations of the actual use of the compound. The majority of these potential exposures were probably caused by the presence of 3-chloro-2-methylpropene as a contaminant in carbofuran.

The Toxic Chemical Release Inventory (EPA) estimated that 23,007 lb of 3-chloro-2-methylpropene were released to the environment, specifically to air, by three facilities that produced, processed, or used the chemical in the United States in 1996. A facility located in Baltimore, Maryland, reporting under industrial classifications for manufacture of industrial organic chemicals (SIC Code 2869) and agricultural chemicals (SIC Code 2879), accounted for 96.4% of the total air emissions (TRI96, 1998).

REGULATIONS

3-Chloro-2-methylpropene is not regulated by the CPSC, EPA, or FDA. NIOSH has not recommended an exposure limit. OSHA regulates the compound under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table B-23.